

DRAFT

Aluminum Research Group - Tucson

Project Prospectus - Charge No. 53811

Sponsor: T. F. Payne - Columbia Falls

Project Title: Reduce Fe and Si Levels in Reclaimed Basement Sweepings Products

Background:

Through normal operations in Columbia Falls, quantities of bath and alumina end up in the pot room basements. On an annual basis, this amounts to approximately 2500 tons of bath and 7500 tons of ore with a combined value in excess of \$3MM.

To recover these materials, the basements are manually cleaned up each year. Because other tramp materials such as bricks, broken concrete, nuts, bolts, welding rods, wood, etc. also end up in the basement, the reclaimed ore and bath, when recycled back to the pots, contributes to iron and silicon contamination of pot metal. The present reclamation system is outlined in the attached correspondence.

At Columbia Falls, a pot is classified as pure metal if the Fe level is less than or equals 0.19%. At present, hot metal averages 0.25 - 0.26% Fe and 0.09% Si with approximately 20 - 25% of pots in the pure metal category.

Project Objectives:

1. Develop a flowsheet proposal for a facility to beneficiate reclaimed basement sweepings. Specifically the proposal should:
  - a. Provide a reclaimed product which is primarily alumina.
  - b. Provide a second reclaimed product which is primarily crushed electrolyte.
  - c. Iron and silicon levels in the reclaimed products should not adversely impact hot metal purity in a significant manner.
  - d. Reclaimed products should be "free" of tramp materials.
  - e. Product form should not introduce handling or environmental/hygiene problems.

Scope:

- o Analyze and characterize samples (received from Columbia Falls) of:
  - 1. Raw basement debris
  - 2. Sweepings
  - 3. Crushed bath
- o Based on analyses, calculate
  - 1. Material balance through reclamation procedure
  - 2. Impact on hot metal purity
- o Preliminary investigation of possible treatment alternatives. Initial consideration will be given to dry methods, specifically
  - 1. High intensity magnetic separation
  - 2. Electrostatic or electrodynamic separation
  - 3. Air classification
  - 4. Electronic ore sorting
- o Evaluate possible alternatives and identify the most promising in consultation with Columbia Falls.
- o Design and implement a laboratory test program to verify the selected proposal.
- o Report to Columbia Falls and determine future course of action (if any).

Project Requirements:

It is estimated that this project will require 6 - 8 man months of effort.

The analyses and characteristics of samples requires some consultation with Columbia Falls Analytical Lab on x-ray and wet chemical methods of analysis.

Priority Assignment:

High

Medium

Low

Target Completion Date: September 30, 1981 (for final report)

Project Leader:

Tom Bolles